भारतीय मानक
Indian Standard

IS 16652 : 2017
(Reaffirmed 2021)

सिंगल सुपर फास्फेट (एसएसपी) उर्वरक उद्योग में पर्यावरण प्रबंधन प्रणाली के कार्यन्वयन के लिए गाइड

Guide for Implementation of Environmental Management Systems in Single Super Phosphate (SSP) Fertilizer Industry

ICS 13.040.40

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भारतीय मानक ब्यूरो
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May 2017 **Price Group 11**

Environmental Management Sectional Committee, CHD 34

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Environmental Management Sectional Committee had been approved by the Chemical Division Council.

Generic Environmental Management System standard, namely IS/ISO 14001 : 2015 ‘Environmental management systems — Requirements with guidance for use’ has been revised and published in 2015 by ISO. Consequent to the revision of ISO 14001, organizations implementing EMS need to implement 2015 version of IS/ISO 14001 within 3 years from the date of publication. Most of the Fertilizer industries in India are implementing IS/ISO 14001 in their systems for managing environmental issues. In order to facilitate the fertilizer industry to quickly understand and pick up the benefits of the latest version of IS/ISO 14001, this standard has been developed for providing guidance specific to fertilizer industry.

This standard provides guidance for implementation of Environmental Management Systems for Single Super Phosphate (SSP) Fertilizer Industry. Based on the guidance provided in the standard it can plan, establish, implement and maintain a framework to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability.

Indian Standard

GUIDE FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT SYSTEMS IN SINGLE SUPER PHOSPHATE (SSP) FERTILIZER INDUSTRY

1 SCOPE

This standard provides guidance for implementation of Environmental Management Systems for Single Super Phosphate (SSP) Fertilizer Industry seeking to plan, establish, implement and maintain a framework to address environmental issues and to contribute to sustainable development. For this purpose, guidance for the requirements laid down in IS/ISO 14001 : 2015 is provided in the standard. Each clause of the standard corresponds respectively with the clauses of IS/ISO 14001 : 2015.

2 REFERENCE

The following standard contains provision which, through reference in this text, constitutes provision of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	*Title*
IS/ISO 14001: 2015	Environmental management systems — Requirements and guidance for use (*second revision*)

3 TERMS AND DEFINITIONS

For the purposes of this standard, terms and definitions given in IS/ISO 14001 shall apply.

4 CONTEXT OF THE ORGANIZATION

Prior to indulging on development of an EMS, the organizations must always keep in mind that the more flexible the EMS is, the easier it will be to implement and the more flexible it will be for future changes. A gap analysis is a good way to determine what the current situation is, and where priority action is needed.

The fundamental concept of IS/ISO14001: 2015 standard is that organization determines internal and external environmental issues that are relevant to its purpose and affect the ability to achieve the intended outcome(s) of its EMS. The organization shall determine the needs and expectation of interested parties that are relevant to EMS and shall determine the boundaries and applicability of the EMS to establish its scope. Interested parties may include legal and regulatory authorities, customers, trade and professional associations, community groups, NGOs, suppliers, employees, etc. In setting the scope, the credibility of the EMS will depend upon the choice of organizational boundaries. Scoping shall not be used as means to exclude activities, products, services or facilities that have or can have significant environmental aspects.

In order to continually improve its environmental performance, the organization shall establish, implement, maintain and review the environment management system.

For initial and/or subsequent review, it is suggested that the management should make a formal announcement on the establishment of EMS compliant to current version of IS/ISO 14001, followed by identification of a core team, team leader, and the targeted timelines from start to end.

The review should take into account all the activities, products and services of the organization. The review should identify and include information on deviation from regulatory requirements, if any, and impacts on the environment, alongwith policy, programmes, procedures, training and work instructions, and operational controls. Where relevant, the ability of suppliers and subcontractors to comply with the EMS programme and applicable regulatory requirements should also be evaluated. It is recommended that the initial/subsequent review considers energy use, resource conservation and information systems so that these aspects may be integrated into the EMS programme, if not done earlier.

The environmental experts/members of project team should collate applicable national, state, local regulations and self-subscribed requirements. These should be compared with the obvious environmental impacts. The compliance to regulatory requirements is the starting point for an IS/ISO14001 compliant EMS. To sum up, the outputs of Initial Review/gap analysis should deliver:

a) A SWOT of the organization’s current overall environmental management.
b) Key focus areas for immediate improvement of environmental management programmes or

procedures that should be strengthened to establish conformance with the standard.

Consider the following as sources of valuable information:

- Equipment manufacturers
- Suppliers and vendors such as waste disposal companies
- Third party organizations such as inspection, testing and calibration laboratories
- Government agencies
- Industry associations
- EHS databases
- Community

Consider benchmarking against other organizations

4.1 General Requirements

This section of the standard mentions the basic requirement to have a formal EMS that is documented, approved, disseminated, maintained and continually improved over time.

The EMS should be broadly based on the flowchart in Fig.1.

5 LEADERSHIP

5.1 Leadership and Commitment

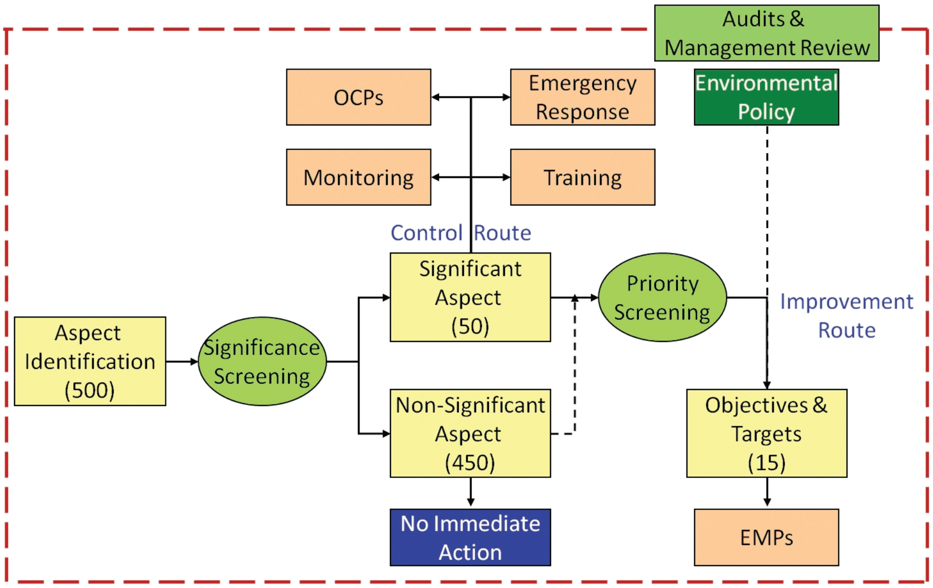
Top management shall participate in formulation of environmental policies considering concerns of interested parties and shall provide all necessary resources for achieving the objectives of EMS. Leadership participation in periodic EMS reviews and promoting continual improvements through setting EMS objectives and targets supports organizational environmental strategic planning.

5.2 Environmental Policy

Environmental Policy is the driver for implementing and improving organization's EMS. The Policy shall be defined by the top management. The Policy should be periodically reviewed during Management Review. Top management should initiate the Policy and provide direction to the EMS team.

The Policy should:

- be clear, concise and practically implementable.
- be relevant to the significant aspects of activities, products and services.
- account for regulatory compliance obligations.
- ensure the prevention of pollution and protection of environment and continual improvement.
- ensure establishment and implementation of an effective EMS.
- be communicated within organization to the workforce and available to interested parties.
- be reviewed and updated periodically.



NOTE — OCP — Operational Control Procedure.

EMP — Environmental Management Program.
Aspect Numbers 500, 50, 450, 15 are only for illustrations.

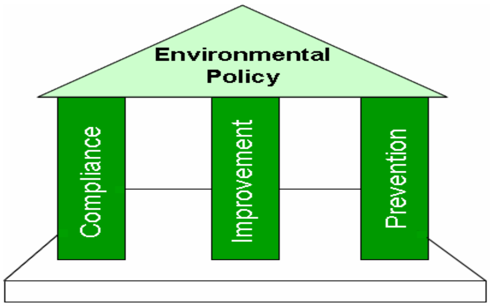
FIG. 1 EMS PROCESS Flowchart

The Policy becomes the foundation for establishing the EMS principles. The Policy establishes broad level goals for environmental performance against which the effectiveness of the EMS will be evaluated. It provides vision and commitment of the top management towards the environment. The very fact that the policy statement can have a significant impact on the company's image, it needs to be clear and verifiable. Policy needs to be clearly understood by workforce to achieve intended outcome.

The Environmental Policy duly established by the top management is to be made available to all interested parties. Everyone at the organization should understand the policy and what is expected of him/her in order to maintain an EMS.

Remember To

- Use the up-to-date version of the Environmental Policy.
- Effectively communicate the Policy to all concerned that is explain, communicate, and verify that employees and contract personnel have understood the policy and can correlate with their job responsibilities .
- While communicating the policy, make sure to focus on the three key areas:
  - compliance with laws and regulations;
  - pollution prevention; and
  - continual improvement.



Top management shall assign responsibility and authority for implementation and reporting by appointing a "Management Representative (MR)" who shall ensure that EMS conforms to IS/ISO 14001. It is recommended to appoint MR who has good knowledge on EMS.

6 PLANNING

6.1 General

All aspect of interested parties expectation, scope and boundaries to be considered to ensure the inclusivity of overall business while planning the EMS.

6.1.1 *Environmental Aspects*

Environmental aspects are the elements of an organization's activities, products, services or physical resources, which may have potentially beneficial or harmful impacts on the environment. The aspects typically include processing, storage, transfer, transportation, discharges and emissions, raw materials and energy use, waste recycling, noise, and dust etc. Impacts include emissions to air; generation of wastewater, hazardous waste; contamination of soil and groundwater; energy use, material use, noise nuisance etc. Complaints from third parties should be included while developing list of aspects.

The organization should have a mechanism to identify all the environmental aspects and their impacts related to activities, products and services that are within the scope of its environmental management system. There should also be a mechanism to shortlist significant aspects. This should preferably be done through defined criteria for significance with due consideration to life cycle perspective, inputs and outputs of its processes, management of change including planned or new developments or new or modified activities, products and services. The criteria should become a part of the EMS manual of the organization. Each aspect should be scrutinized for significance and results recorded. It is not necessary to apply the same criteria cut-off for all departments. A careful evaluation of the size and nature of activities should help decide the criteria.

Identification of aspects is essential and important, since the rest of the system is built on mitigating the impacts of these aspects. When the aspects are systematically identified, they can be managed. Identification of aspects is a continual process under the EMS system. The aspects identification process includes present and future impacts that the activities are having, and will have on the environment. While doing so, it is imperative to consider legal, financial and business risks associated with the aspects.

6.1.1.1 *Identification of environmental aspects*

One may begin by asking the following questions while identifying the environmental aspects and their impacts:

- Do the organization's activities, products and services affect the environment? If yes, what and how much impact footprint they leave?

- Are these impacts adverse?
- Are procedures in place for the identification and control of adverse environmental impacts for existing, new or altered products and services?
- Are there setups at the organization that have special environmental concerns which must get addressed?
- Are there situations where an event of a process failure or human error, the environmental impacts would be severe?
- What is the likelihood of an emergency?
- Do activities have resource conservation potential? Can these be identified and potential estimated?
- What would be the scope of the identified environmental impacts?

As the environmental aspects of an organization's activities, products, or services interact or can interact with the environment, these are mainly related to:

- use of material and natural resources like raw materials, water and energy;
- use or generation of hazardous chemicals such as sulphuric acid;
- emissions to air;
- wastewater ;
- storm water;
- leakage / overflow from storage tanks;
- solid / liquid process wastes;
- noise generation;
- VOC emissions; and
- discarded chemical containers/ metallic scraps and other solid and hazardous wastes.

While identifying environmental aspect it is important to consider normal, abnormal and emergency operating conditions, shut down and start up conditions and other reasonably foreseeable situations.

The Environmental impact is change to the environment whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.

For example: Boiler operations.

Activity, Product, Service	*Aspect*	*Impact*
Boiler operations	Air emissions	Air pollution
	Fuel consumption	Natural resource depletion
	Boiler blow down	Water pollution
	Water consumption	Natural resource depletion

The significant environmental aspects are the current issues with the greatest potential for environmental impact.

While determining significance, criteria should be defined and deployed. As applicable, evaluation of aspects should include all phases of operations from the design phase to R&D, marketing, outsourcing, purchasing, production, hazardous waste and solid waste management, product packaging, distribution, sales and utilization of the finished product.

6.1.2 *Determination of Compliance Obligation*

Organization needs to identify the compliance obligations that are applicable to its environmental aspects and determine how they apply to organization. While identifying legal obligations, it may include; National and international laws, state and local government legal requirements and provisions under permits like consent to operate, licenses for storages for hazardous substances etc. Compliance obligation shall also consider all interested parties concerns related to its environmental aspects like transportation of product, warehouse storage etc.

These requirements can be partially established by reviewing the previously completed aspects and impacts considering:

- How the organization identifies, tracks and accesses legal requirements?
- How changes in the requirements are tracked?
- How employees and others, such as sub-contractors and suppliers are informed of any changes in legal requirements?
- How organization creates awareness and competency of the workforce on legal requirements?

The basic purpose of identifying and maintaining access to legal requirements is to ensure that the organization is aware about its legal obligations. It will also support the awareness and competency of the workforce. The purpose of identifying these items is to ensure that all operations take into account all applicable legal obligations.

The organization should include all requirements pertinent to its aspects and impacts in the development of its Legal obligations list, including:

c) Site-specific requirements of operating permits/consents.
d) All applicable Environmental Laws.

Register of regulation is prepared, updated from time-to-time and compliance requirement adhered and monitored.

A typical list of legal obligation is given in Annex A

6.1.3 *Determining Significant Environmental Aspects*

Significant environmental aspects are determined by applying specific criteria to each aspect.

These are:

a) Legal Requirements (LC),
b) Interested Party Concerns (IPC),
c) Business Concerns (BC), and
d) Environmental Concerns (EC).

The suggested SSPD rating criteria has four elements on which every aspect (other than those where overriding criteria is applicable) should be numerically rated. The product of all four elements gives the final score to the aspect.

SSPD EVALUATION CRITERIA FOR ENVIRONMENTAL IMPACTS

Marks	*Severity (SV)*	*Scale (SC)*	*Probability (P)*	*Duration (D)*
1	Low	Within 2 m	Once in a month	Less than 30 min
2	Moderate	Within plant	Once a fortnight	30 min to 4 h
3	High	Within works	Once a day	4 h to 8 h
4	Injury	Within 3 km radius from works	Once a shift	8 h to 24 h
5	Fatal	Beyond 3 km radius from works	Occurs frequently	> 1 Day

The four elements are:

a) Scale (SC) – Area of impact
b) Severity (SV) – Degree of damage
c) Probability (P) – Occurrence of the impact with and without existing controls
d) Duration (D) – Duration of impact

Any impact falling under LC, IPC or BC shall be considered as significant. The SSPD criteria shall be applied to those impacts, which are not falling under the LC, IPC, BC. To begin with, any of the impact having total score (SV × SC × P × D) equal to or more than 300 shall be treated as significant environmental aspect. This score shall be gradually lowered to cover all the environmental aspects. All aspects related with significant environmental impacts shall be treated as significant environmental aspects.

NOTE — Evaluation of significant environmental impacts may vary from organization to organization and subject to criteria defined for significance.

Total Marks = Σ Weightage × Marks (for summation of all criteria)

Cut of Marks = 300; Beyond which an impact to be considered as significant

NOTE — 5 Marks should be the most severe/highest and 1 least.

The baseline cut off for Final score should be fixed. Therefore, the aspects that have Final score of more than the cut-off are significant.

Based on the above, aspects are identified as significant or non-significant.

It should be ensured that all aspects that are under control and influence of the organization are covered. These aspects shall be used to define objectives and targets.

Typical Environmental Aspects of a SSP Fertilizer plant are given in Annex B for reference.

6.2 Environmental Objectives and Planning to Achieve Them

6.2.1 *Environmental Objectives*

This is the transition point from identification of significant environmental aspects to continual improvement. The objectives and targets should be aligned with the environmental policy and significant aspects and impact, which support the organization’s commitment to continual environmental improvement. Due consideration should be given to the financial, operational and business limitations of the organization.

Continual improvement cannot be achieved until objectives and targets are defined, implemented and maintained.

In setting environmental objectives and target, all significant aspects are to be considered. The objectives shall lead to improvement in reduction in specific raw materials consumption, other process materials, improving energy efficiencies, specific water consumption, emissions and effluents etc. Objectives should be set to establish short and long-term goals in environmental performance.

For all objectives and targets, measurable environmental performance indicators should be established that could later be used for environmental performance evaluation. This shall provide information to management about the functioning of IS/ISO14001 and become basis for a "Management Review", when coupled with audit reports and financial performance data. Each objective and target should have a clearly specified base year/time as well as the Target Year/time.

- Involve operational staff as they best sets objectives and targets. Since they will be ultimately responsible for performance, they should be included in the decision-making process when developing Objectives and Targets.
- Objectives should be consistent with the Policy. The Compliance, Pollution Prevention and Continual Improvement philosophy of the Policy should drive them.
- Make Objectives flexible. Make a statement of the results desired, and allow staff members to define the "How" portion wherever possible.
- Make Objectives simple, at first. Then build on them.
- Make Objectives understood to all members of the organization.
- Make Objectives and Targets SMART (Specific, Measurable, Achievable, Realistic and Time bound).

Check points for setting objectives

- Are they consistent with the Policy ?
- Are they practicable and can they be tracked and monitored?
- Are they documented at relevant functions and levels in the organization?
- Are they consistent with the business strategy?

Some examples are:

a) Reduction in specific consumption of Rock phosphate from "X" kg/kg SSP to "Y" kg/kg SSP,
b) Reduction in specific water consumption per unit of SSP,
c) Reduction in specific energy consumption per unit of SSP,
d) Reduction in Fluoride emission per M3 of discharge to air, and
e) Increase in training hours on EMS.

6.2.2 *Planning Actions to Achieve Objectives*

Organization shall establish an action plan to achieve objectives by defining responsibilities, methods, and timeframe for completion including provision of resources. The objective should be communicated to all concerned and a system to be established for internal tracking.

Having identified the environmental Objectives and Targets, the next step shall be to have an action plan in place to accomplish them. The Environment Management Programmes (EMPs) should be integrated into the strategic plan of the organization. Scheduling of actions, resource allocation, and responsibilities should be specifically mentioned in the EMP. The actions must be included in the documentation of the EMP so that all operational practices and responsibilities are reviewed periodically.

EMP is basically a "road map" with clearly specified actions, responsibilities by name and target dates. These should be reviewed by designated personnel and approved by the top management. It is not necessary to contain one EMP in one document. Linkage to other documents should be acceptable for the EMS audit. It should be ensured that the roles and responsibilities, processes and schedules are defined.

Monitoring of EMPs is primarily the responsibility of the concerned line manager for each specific activity. They should routinely report to senior management the status of any/all environmental programs and projects under their control. This shall support integration of environmental issues into the scope of management concerns at the senior level.

- Keep the EMPs simple.
- Consider employee consultation/ input wherever possible.
- Establish EMPs based on current programmes
- Include health and safety programmes
- Communicate the expectations of the EMPs to all concerned

All EMPs shall be reviewed periodically to assess the status of implementation.

Re-evaluate the action plans when changes occur in procedures or facilities.

7 SUPPORT

7.1 Resources

For an EMS to be functionally effective, individual roles and responsibilities must be clearly defined as they relate to the overall implementation of the EMS. Top management should provide the resources needed to ensure that the EMS is effectively implemented. A Management Representative (MR) appointed by top management is responsible to oversee the implementation of the EMS. Organizational organogram should be made to support EMS implementation.

To ensure effective development and implementation of an EMS, it is necessary to allocate appropriate resources, and assign appropriate roles, responsibilities and authorities. Top management of the organization defines and documents the responsibilities, authorities and interrelationships of all key personnel. The key roles that effect environmental performance should be included in the employee's job profile and performance evaluation. All employees of the organization should clearly understand their environmental roles and responsibilities, as well as understand the importance of the environmental objectives.

7.1.1 *The Role of MR*

The MR should be a member of the facilities management team. MR should have overall responsibility for compliance with the requirements of the EMS, and should ensure that regulations are complied with.

7.1.2 *Staff Roles and Responsibilities*

The specific responsibilities of the MR do not absolve line management from compliance responsibilities for regulations and operational requirements of the EMS. For example, line managers may be delegated the responsibility to detail operating procedures which operations staff must follow.

While defining roles and responsibilities organization should ensure that:

- All roles, responsibility and authority are defined for environmental management,
- The roles are communicated,
- Adequate resources allocated,
- MR appointed, and
- Integration of EMS into other business management functions.

7.2 Competence

Management has an essential role in developing organizational awareness and motivation by communicating environmental Policy and demonstrating commitment.

The basic intent of building competency through training and awareness is to ensure that employees understand processes, procedures and their responsibilities for effective implementation of EMS. The training should also include managers to ensure that they understand the EMS, know their responsibilities towards EMS.

Training need identification and execution of training programs should consider the following:

- New Employee Hiring
- Change in Job Description
- Corrective Action notes failure to follow instructions
- New or Altered Procedures/Processes
- Changed EMS Aspects/ Objectives
- Target New Regulations (local, state or national)
- Job under performance
- EMS Audits

A typical training matrix

Type of Training	*Audience*	*Purpose*
Raising awareness of the strategic importance of environmental management	Senior Management	To gain commitment and alignment of the environmental policy.
Raising general environmental awareness	All Employees	To gain commitment to the environmental policy, objectives and targets and to instill a sense of individual responsibility
Skills Enhancement	Employees with environmental responsibilities	Improve performance in specific areas—operations, R&D, engineering
Compliance	Employees whose actions can affect compliance	Ensure regulatory and internal requirements for training are met.

Employees should also be kept updated on the regulatory changes that affects their job performance. Training modules for management and operations staff should be developed to ensure the continuing education. Where in-house training is not adequate, out-sourced training should be utilized.

The subcontractors and others with any impact on the EMS are equally important and should receive training consistent with their impact on the system. The MR/HR should be responsible for the establishment of training requirements within the organization. Training should also include communication of the following:

- Requirements of the system, the importance of regulatory compliance, and the importance of compliance with environmental policy.
- The potential negative environmental effects of the employee's work. The positive effects of improved performance on their part.
- Their responsibilities in achieving compliance with the policies, regulations and EMS requirements.
- Consequences of non-conformances.

Training requirements should be more detailed for those individuals that are responsible for verification of environmental performance, either regulatory compliance verification or EMS conformance verification. These include internal auditors. The training requirements and records should be maintained as a part of the documentation of the EMS. On-the-job instruction should be included, but clearly documented where required.

7.3 Awareness

It is important that persons doing work under the organization control shall be aware of the Environmental Policy and commitments, Environmental aspects and significant impacts related with their work. They also contribute significantly to overall EMS improvements. Responsible team for EMS implementation must organize periodic awareness sessions on Environmental Policy, Organizational objectives and key applicable legal requirements to enhance awareness, achieve compliance and improvements.

7.4 Communication

Effective communications helps in motivating employees, understand their environmental responsibilities, processes and procedures, monitor environmental performance and identify areas for improvement. Organization shall determine other internal and external communication relevant to environmental management system including what it will communicate, when to communicate, whom to communicate and what shall be the methods and tools to communicate. Communication shall be transparent, credible, clear, appropriate and reliable.

7.4.1 *Internal Communication*

Communication in an EMS includes the communication of internal and external environmental information to management, and the communication from management to others regarding environmental impacts. The communication should be designed to:

- demonstrate management's commitment to the environment;
- make others aware of the environmental policy and commitments;
- address concerns about the environmental activities by external parties;
- announce the strategic environmental management approach; and
- establish a line of communication defining emergency responsibilities.

7.4.2 *External Communication*

The organization's top management, the MR or the designated liaison should be the only one to release information to third parties about environmental matters. Be as open to third party inquiries as possible, acknowledge the existence of problems where they arise, communicate about them, and find solutions as early as possible.

Consider communication strategies for neighbours, community groups, other interest groups, local officials, regulatory agencies, and emergency responders. Communication should be clear enough to leave no room for misinterpretation.

7.5 Documented Information

The intent of documentation is to ensure that organization create and maintain documented information in a manner sufficient to implement the EMS. The entire EMS right from the development of the policy through the implementation, operation and management review need to be formally and appropriately documented, that is, written, authorized, approved, practiced, monitored and finally reviewed. The documentation includes all aspects of EMS from Policy to management review and records. Documentation can be in the form of hard copies or electronic copies maintained on computer system, ensuring accessibility as necessary.

The implementation of EMS requires specific actions, in order of priority, dealing with processes, products, services, projects, facilities that relate to the already established environmental Significant Aspects, Objectives and Targets. The actions should be included in the documentation of the EMS so that operational practices and responsibilities are reviewed, revised and deployed.

The EMS documentation development should define the structure of documentation and records that need to be maintained. This can be broadly outlined in the EMS Manual. It is suggested to have the documentation maintained at three levels namely,

a) Level-1 that includes the EMS Manual that describes the commitment of the Management towards environmental protection. The manual should be fully aligned with the IS/ISO14001 standard requirements. This should mainly include the business brief, policy and responsibilities of senior management.
b) Level-2 documentation that include environmental aspects impacts evaluation sheets, environmental legal register, Operational Control Procedures (OCPs), environmental objectives and targets, EMPs and an on-site emergency plan. The line managers and frontline working staff normally use this level documentation.
c) Level-3 routine and non-routine records that provide evidence that the EMS is effectively working. Various standardized forms and formats used to maintain records should also be included here. This level of documentation is typically used by operating staff to record their day-to-day actions on environmental management.

Ensure that relevant documents are cross-referenced across the three levels.

The suggested list of documents under EMS but not limited to is as under:

a) Scope of EMS;
b) Environmental Policy;
c) List of aspect and associated impact assessment;
d) Compliance obligation – legal register;
e) Procedure(s) for establishing criteria and determining significant aspect and organizational risks and opportunities and criteria used for this purpose;
f) Environmental objectives;
g) Planning to achieve objectives;
h) Evidence of competency;
j) Internal and external communication;
k) Emergency preparedness and response plan;
m) Evidence of monitoring, measurement, analysis and evaluation results;
n) Evidence of compliance, internal audit results; and
p) Management reviews.

Keep the documents and records simple and up-to-date.

Documentation is not required for every procedure or work process. Employee experience, skill, qualifications, standard techniques, good work practices are all adequate alternatives. Manufacturer's operating instructions may also be employed where they get the tag of "Documents of external origin".

Work instructions should be clear and concise. Each step in the instructions or the procedures should 4be given sequentially, and language should be for the easy understanding of the end user.

Make sure that all the documents, records, forms and formats are appropriately identified and numbered. For good control over the documentation, the responsibility and authority of preparation, review, approval, issue and changes to these, and their withdrawal and disposal should be clearly documented. To ensure that the current versions are being used and the older versions are withdrawn. One good way to have effective control is by document version control.

Similarly, where documents are placed in a soft form that is on the local intranet, the authority of their access and maintenance should be clearly defined.

Generally, the authority of control over documents should lies with the MR.

8 OPERATION

8.1 Operational Planning and Control

Operational control over all activities significantly affecting the environment is a requirement of IS/ISO 14001. To assure this, Operating Control Procedures (OCPs) should be written down for these activities. This provides consistency when changes in people occur, and identifies employees as to what their job responsibilities are. Care should be taken to include all functions (like purchase, marketing, transportation, contract manufacturing etc) that may have a direct or indirect environmental impact.

Maintaining up-to-date master list of all the EMS documents to control the existence, organization and ownership of each procedure, is a good idea.

The starting point of implementation of the EMS is the establishment of Operational Controls to verify that the EMS is in place.

Preparation of OCPs should preferably be delegated to departments under the direction of the area Manager and the MR. The department should review environmental requirements and effects within their area of operation as defined in the Aspects, Objectives and Targets. Other way out is to centralize, it with the MR. This activity is usually well accomplished by a team.

Integration of OCPs with other management systems further strengthens the commitment of the organization to environmental stewardship.

What to do:

- Develop written OCPs for controlling key activities and operations that are associated with Significant Aspects.
- Ensure that these OCPs cover all normal and abnormal operating conditions, including emergencies; plant shut down and start up.
- Ensure that employees are trained on these OCPs.
- Once operational controls are established, consider what maintenance and calibration activities will be required for those procedures.
- Review procedures with those performing the work to ensure they are correct and to generate ideas for improvement (you should preferably talk with them prior to developing the procedure).

8.2 Value Chain Control

Most of the SSP manufacturers import Rock Phosphate and also have arrangement with toll manufacturers to satisfy the customer requirements. IS/ISO 14001 includes the suppliers and toll manufacturers' environmental performance. A record of such external suppliers and vendors shall be assessed and recorded to demonstrate life cycle approach in EMS.

8.3 Emergency Preparedness and Response

Emergency response needs to be planned well in advance. Emergency preparation and procedures should be established (documented), implemented (put into action) and maintained (tested and tried through training and mock drills) to respond to unplanned events. Procedures should define control mechanisms, operational requirements and other controls during these events.

For an operating site emergencies may arise and they do not come knocking at the doors. These are all unplanned events that may have serious environmental impacts. The philosophy behind emergency preparations is to pre-plan emergency actions to mitigate, reduce, and/or eliminate the EHS impacts that can carry huge financial implications. This investment is generally recovered the first time a serious incident occurs but is also difficult to quantify. Insurance costs may also be negotiated and brought down based on enhanced preparedness.

Most organizations would have an Emergency Action/ Response Plan in place. It needs to be reviewed at least once from environmental impact viewpoint. The additional requirement to be taken care of is that all significant environmental aspects that qualify the definition of environmental emergency are adequately addressed. The potential emergencies can be marked while doing the Gap analysis and also during the aspect-impact evaluation where emergency events may be made a mandatory overriding criteria for significance, meaning that if an emergency situation is possible, label the aspect as significant.

8.3.1 Potential Emergency in SSP Plant

a) Fire (Coal crushing and feeding/ FO heating/ HSD storage /Empty Bag storage);

b) Explosion (LPG, DA-Oxygen gas cylinders storage/handling/use; Pressure Vessel operation);

c) Major Leakage/ Spillage of sulphuric acid / Scrubber acidic water / FO;

d) Scrubber malfunction during mixer operation causing accidental release of HF gas;

e) Structural collapse; and

f) Natural Calamity (Earth quake / Heavy Rains).

A periodic emergency drill must be carried out considering potential emergency scenarios and effectiveness of drill should be assessed by top management for improvements. All documents and records of such drills and reviews shall be maintained.

9 PERFORMANCE EVALUATION

9.1 Monitoring, Measurement, Analysis and Evaluation

Measurement and monitoring are performed to see if the requirements of EMS implementation, OCPs, Objectives and Targets are being met. The EMS manual should include procedures for this measuring and monitoring process. Measurement and monitoring requirement of key performance indicators should be identified and included in the Monitoring and Measurement Plan. The Plan should define the EMS and environmental parameters to be measured/ monitored, frequency and responsibility for monitoring and instruments/ equipment to be employed for monitoring. To ensure that the monitoring equipment always provides the correct results, periodic calibrations, internally or externally should be carried out.

The review of monitoring should help in identifying areas that need Corrective Action and/or improvement.

Identification of the key performance indicators that will be used to monitor the EMS implementation should be an integral part of the actions taken for environmental management. The statement "What get measured gets managed" applies here too.

Make sure to

- Identify key process characteristics and how to monitor them?
- Develop a process to review compliance with regulations (audits?).
- Determine how to measure the performance in relation to the EMS Objectives and Targets?

Ask the key questions

- Which operations and activities can have significant environmental impacts?
- What are the key characteristics of these operations and activities?
- How to measure these characteristics?

Take actions

- Keep monitoring requirements limited to KEY process characteristics.
- Make sure equipment are routinely maintained and calibrated.
- Regulatory compliance should be integral to the measuring and monitoring programs for the EMS.
- Cross check that the measuring and monitoring verifies conformance with the Policy, and Objectives and Targets of the EMS.
- Focus on those issues that can be controlled.
- Ensure that the resources to implement the program as defined are provided.

For performance evaluation, key performance indicator need be identified based on significant aspects and may be classified into: Operational performance indicator (OPI), Management performance indicator (MPI) and Environmental condition indicator (ECI) etc.

9.1.1 *Evaluation of Compliance*

The standard expects that the overall responsibility for evaluation of compliance to the applicable legal and other requirements of the organization are entrusted to few responsible individuals. The periodicity of compliance evaluation should be clearly established and specified. The regulatory requirements should be compiled with and a compliance status report prepared and periodically updated. The report should be presented to organization's top management with key features including the non-compliances, if any, discussed during the management review.

Compliance to Legal and other requirements being one of the cornerstones of EMS (**6.1.3**) needs to be ensured and periodically verified.

The responsibility of obtaining legal compliance that includes licenses to operate should be clearly spelt out. An appropriate person may be nominated with the distinct responsibility for the same. MR and HODs should oversee that other self-imposed requirements are complied with. MR should keep the top management abreast on the compliance status and possible concern areas regularly and during the management review.

A periodic review of environmental legal compliance may be established to ensure compliance. All key records such as review of documented information, facility inspections by statutory authorities, sampling and testing to comply with the statutory standards shall be maintained.

9.2 Internal Audit

An EMS should include routine systems audits. The audits should be carried out in order to determine whether the EMS conforms to plan arrangements for environmental management including the requirements of IS/ISO 14001 and to determine whether the EMS has been effectively implemented and maintained. Additionally, it should provide information on the results of audits to management.

The EMS must identify the frequency of internal audits.

These qualifications are essential for internal auditors.

a) Good knowledge and appreciation of the technical and environmental aspects of facility operations.
b) Up-to-date information on environmental laws and regulations.
c) Understanding of the EMS.
d) Trained in EMS auditing techniques.

The intent of auditing is to inform the management to make decisions aligned to EMS vision of the company. Identified personnel are trained in-house to be made competent in delivering the objective information to be useful for system modification/improvement. One good way to train internal auditors in operating their EMS is to involve employees from one department in the audits of another. This can be performed in conjunction with internal auditors of other organizations prescribing to IS/ISO14001 based EMS certification to gain "internal" as well as external perspective.

Procedures should clarify audit scope, audit frequency, auditor qualifications, reporting requirements and follow-up. Two major objectives should be expected from an audit:

a) Determine if the system is effective in achieving the expectations of the Policy.
b) Determine compliance with the environmental management system as outlined by the EMS Manual, Aspects-impacts, Objectives and Targets, EMPs, OCPs, and to check for their effective implementation.

The audit should be carried out with respect to:

a) Compliance to the requirements of IS/ISO 14001.
b) Compliance to Environmental Policy.
c) Effectiveness of EMPs.
d) Organizational Structure.
e) Communication, Staff awareness and training.
f) Monitoring and feedback.
g) Status of the non-conformity report and the implementation of the corrective and preventive action.
h) Compliance against Legal and Other requirements.

The internal auditors should follow the following basic steps:

a) Investigate and understand the management systems.
b) Assess the internal controls including awareness of personnel.
c) Review of records, sampling and verification.

The auditors should make use of Questionnaires, Checklists, Interviews, Measurements and direct observations as the audit tools, depending on the nature of function being audited.

Additionally the auditor should:

a) focus on objective conformance evidence.
b) discuss audit findings with operational staff during the audit. This may lead to a better understanding of root causes and systemic failures. It shall also identify and record areas for improvement and action plans.
c) perform audits with the area team as it has the requisite technical, regulatory, management, and operational expertise to effectively determine "operational control".
d) where possible consider auditing for EMS conformance along with regulatory compliance. To support this, the structure of the EMS audit protocol should address the legal issues at the heart of the audit.
e) record the non-conformance in the audit report/sheet, inform the auditee team about the same and ask for suggested remedies, corrective and preventive actions. Where the auditee teams are weak, the auditor should support them by suggesting solutions and clarifying the requirements.

9.3 Management Review

Management Review is an essential part of the continual improvement of the EMS. The improvement process does not end with the establishment of an initial Policy, realization of initial Objectives, or certification of the EMS to a Standard. Management Review is the essential element for systems improvement, alongwith preventive and corrective action. The scope of a Management Review of the EMS should include all environmental potentialities for organization's activities, products and services.

The Review should assess the extent of compliance or nonconformance to the EMS Standard, and then review the effectiveness of corrective as well as preventive actions. Management Review should also suggest corrective measures to solve problems identified in EMS design, intent, or scope. The form of the Management Review could be a dedicated internal audit of the system for "top management". This Audit and Review will be more effective if the participants have the requisite expertise. The report from such a review should be submitted to the top management, the MR, and appropriate line management.

The management review should be conducted at two levels, namely departmental and organization. Agenda for departmental reviews, to be chaired by HOD, should include:

a) Minutes of previous Departmental review meeting;
b) Results of the EMS Audits;
c) Performance against Objectives and Targets, progress of EMPs;
d) Environmental Incidences / Learning Incidences;
e) Corrective and Preventives Actions; and
f) Specific training and resource requirements.

The MR should plan for conducting the required organization level Management Review. The agenda of management review, to be chaired by Organization Head, should include:

a) Minutes of previous MR Meeting;
b) Results of the EMS Audits (Internal and External);
c) Communication from Relevant Interested Parties including complaints;
d) Performance against Objectives and Targets;
e) Progress against EMPs;
f) Compliance against Legal and Other requirements;

Management Review?

- Is "top management" involved in the process?
- Are the results being documented?
- Is there a follow-up procedure for action items that result from the review? Any changes since the last management review should be considered as to how they might impact the actual or potential environmental aspects of the firm. Someone should be responsible for follow-up.
- Does the review include the financial efficacy of the programme's activities?

Questions to Ponder During Management Reviews

- Did we achieve our objectives and targets? (If not, why not?) Should we modify our objectives?
- Is our environmental policy still relevant to what we do?
- Are roles and responsibilities clear and do they make sense?
- Are we applying resources appropriately?
- Are the procedures clear and adequate? Do we need more? Should we eliminate some?
- Are we monitoring our EMS (for example, via system audits)? What do the results of those audits tell us?
- What changes in activities, products, or services effect the EMS and its effectiveness?
- Do changes in laws or regulations require us to change some of our approaches?
- What stakeholder concerns have been raised since our last review?
- Is there a better way? What else can we do to improve?

g) Review of suitability of Environmental Policy and Objectives;
h) Corrective and Preventives Actions;
j) Specific resource requirements;
k) Changing circumstances, including developments in legal and other requirements related to the environmental aspects; and
m) Recommendations for Improvement.

The frequency of management review should be clearly specified in the EMS Manual. Care should be taken not to conduct too many or too few reviews. In general 2-3 reviews during a year should be sufficient. The MR, along with the organization's head, EHS Head, and other senior management representatives should review the overall effectiveness of the EMS. The results of the review should be used to determine modifications to the EMS required for achieving continual improvement. Follow-up at a later date to verify that the EMS modifications were effective is also needed.

10 IMPROVEMENT

10.1 Non-conformity, Corrective Action and Preventive Action

The results of monitoring and measurements, audit findings and other systemic reviews should be documented and reviewed, and must lead to corrective actions. Procedures should be in place so that the organization is able to ensure that Corrective Action has taken place, and that it has been effective.

Further, the root cause of the systemic failure should be determined, if possible. Patterns and trends should be noted and analyzed. Preventive actions should be employed on potential non-conformities, for example those potential situations where if action is not taken now would lead to non-conformity. These should lead to determination of preventive actions that must be taken and documented.

The corrective action and preventive action part of any EMS will be the most scrutinized by regulatory agencies in the event of a catastrophe. It will also be one of the most scrutinized parts of the EMS during a certification audit because of its importance in reducing the potential of an environmental catastrophe. Certifying agencies would expect the organization to show documentation that several corrective and preventive actions have been taken which conforms to the design specifications of the EMS, and that follow-up has occurred.

There are a great many causes for such failures, including items such as human fatigue, error, poor equipment or equipment maintenance, or errors in the design of the EMS itself. By recording the events of a non-conformance and its corrective action and preventive action, patterns of success and failure of the EMS can be reviewed and the system, the equipment, or the people adjusted accordingly.

Non-conformance may be identified with the help of,

a) monitoring and measurement activities.

It should be understood that	
Preventive Actions normally include analysis of environmental performance indicators to determine probabilities of non-conformance.	**Corrective Action** will be the process changes or procedural activities that are initiated if and when the deviations are detected identifying root cause
Preventive Actions usually, but not always, are targetted around engineering and/or administrative changes against potential non-conformity	Corrective Actions are focused to eliminate the root cause of deviation and is the responsibility of the supervisor in a department

b) audits (internal or external).

c) communication from interested parties (Internal or External).

d) evaluation of compliance against Legal and Other requirements.

e) in-process supervision and control.

f) environmental Incidence Record.

It is important to understand the difference between Corrective Actions and Preventative Actions.

If there is a recognizable pattern of non-conformance, a good practice should be to register the Corrective Action and report it.

Some methods for inquiry, corrective and preventive measures are:

a) Determine the cause;

b) Decide if an immediate action is required. If Yes, decide the action to be taken;

c) Take action to lower the risks to acceptable levels;

d) Check to see if measures are effective; and

e) See if there are any shortcoming of Corrective Actions and Preventive Actions.

The MR should review and record pertinent EMS performance information with management and employees alike. This should include non-compliances identified in internal audits, complaints, monitoring deviations, incidents, improvement resulting in waste reduction, pollution prevention or others reducing environmental adverse impact.

As with the reporting of Corrective Actions, it should be clear to all employees that everyone is responsible for resolving non-conformances as well. Emphasis is on problem solving rather than focusing on the negative aspects of human error can go a long way in achieving this goal.

10.2 Continual Improvement

Organizational shall demonstrate its continual improvement through trend analysis. The year on year objectives should demonstrate improvements against established environmental performance indicators.

Some example of improvement trends are reduction in specific consumption of raw material over last three years (OPI), trend of improvements in energy efficiencies (OPI), Ambient air quality (ECI), Number of trained EMS auditors (MPI), Reduction in number of incidents and accidents (MPI), etc.

ANNEX A

(*Clause* 6.1.2)

TYPICAL LIST OF LEGAL OBLIGATIONS

Act / Rules	*Procedural Requirements*	*Department Responsible*
The Water (Prevention and Control of Pollution) Act, 1974 with latest amendments and The Water (Prevention and Control of Pollution) Rules, 1975 with latest amendment.	• **Application for Consent to Establish** (before taking any step for establishing an industrial unit) in the prescribed form of the concerned State Pollution Control Board along with prescribed fee	
	• **Application for Consent to Operate** (before commissioning the facility of the company) in the prescribed form of the concerned State Pollution Control Board along with the Prescribed fee	
	• **Application for renewal of Consent to Operate** before its expiry in the prescribed form of the concerned State Pollution Control Board along with the prescribed fee	
	• **Submit compliance reports** against consent conditions including monitoring results with the applicable wastewater discharge standards at the intervals prescribed by the State Pollution Control Board	
The Water (Prevention and Control of Pollution) Cess Act, 1977 with latest amendment and The Water (Prevention and Control of Pollution) Cess Rules, 1978 with latest amendment	• **Submit water cess returns** to the concerned State Pollution Control Board in the prescribed format and payment of water cess on receipt of the bill.	
Central Ground Water Authority (CGWA) 2012	• **Notified Area – 80 Blocks for Non-industrial use of ground water**	
	• Non Notified Area – water recharging for water withdrawal and permission for new bore well from District Magistrate / Collector	
The Air (Prevention and Control of Pollution) Act, 1981 and The Air (Prevention and Control of Pollution) Rules, 1982	• **Application for Consent to Establish** (before taking any step for establishing an industrial unit) in the prescribed form of the concerned State Pollution Control Board along with prescribed fee	

Act / Rules	*Procedural Requirements*	*Department Responsible*
	• **Application for Consent to Operate** (before commissioning of the facility of the company) in the prescribed form of the concerned State Pollution Control Board along with the prescribed fee.	
	• **Application for renewal of consent to operate** before its expiry in the prescribed form of the concerned State Pollution Control Board along with the prescribed fee.	
	• **Submit compliance reports** against consent conditions including monitoring results with the applicable emission standards at the prescribed intervals	
The Environmental (Protection) Act, 1986 and The Environment (Protection) Rules, 1986	• **Obtain Environmental Clearance (EC)** in case industry falls in the Schedule I of revised EIA notification of 2006 from Ministry of Environment and Forests. This is applicable for new as well as modernisation / expansion projects falling under Schedule I.	
	• **Submit compliance reports** against EC conditions including monitoring results with the applicable emission standards at the prescribed intervals	
	• **Submit environmental statement** to the concerned State Pollution Control Board in the prescribed Form V before 30th September every year for the last financial year. The environmental statement to be submitted by those units who require consent under *Water Act* or *Air Act* or Authorisation under Hazardous Wastes (Management and Handling) Rules or both.	
The Hazardous Wastes (Management Handling and Transboundary Movement) Rules, 2008 with latest amendment.	• **Application for authorisation** in the prescribed form of the State Pollution Control Board	
	• **Application for renewal of authorisation** before its expiry with the concerned State Pollution Control Board in the prescribed form.	

Act / Rules	*Procedural Requirements*	*Department Responsible*
	• **Provide the filled in copies of manifest** (Form XIII) as prescribed to the transporter of the waste and the concerned State Pollution Control Board. Occupier to provide transporter with 6 copies of the manifest (Form 13) as per the colour codes indicated below: Copy 1 (White) forwarded to Pollution Control Board by the Occupier Copy 2 (Light Yellow) Signed by the transported and retained by the Occupier Copy 3 (Pink) Retained by the operator of a facility Copy 4 (Orange) Returned to the transported by the operator of facility after accepting waste. Copy 5 (Green) Forward to Pollution Control Board by the operator of facility after disposal Copy 6 (Blue) Returned to the occupier by the operator of the facility after disposal	
	• **Obtain no objection certificate** in case the HW is transported for the final disposal to a facility for treatment, storage and disposal existing in other state, other than the state where HW is generated, then Occupier shall obtain NOC from SPCB of both the states. In case of transportation of hazardous wastes through a State other than the State of origin or destination, the Occupier shall intimate the concerned State Pollution Control Boards before he hands over the hazardous wastes to the transporter	
	• **Occupier to provide transporter the relevant information** regarding the nature of the wastes and measures to be taken in case of emergency (Form 10 – transport emergency card)	
	• **Maintain Records** of Hazardous Wastes in the prescribed format (Form 3).	
	• **Submit annual return** regarding disposal of Hazardous wastes in the prescribed format (Form 4) to the concerned State Pollution Control Board.	

Act / Rules	*Procedural Requirements*	*Department Responsible*
	• **Report to the State Pollution Control Board of the accident occurred** on the site or during transportation of hazardous wastes (Form 5).	
	• **Follow specified procedure for Import**, in case involved in importing Hazardous waste.	
	• Maintain the record of import of hazardous wastes in the prescribed form (Form 6A).	
	• Follow specified procedure for export, in case involved in exporting hazardous wastes.	
	• **Inform the Central Government** (Ministry of Environment & Forests) **of the permission sought** for exporting, **permission granted** for export and **details of export** in Form 7.	
	• **Obtain approval for hazardous waste processing**	
	• ***Display board for public for hazardous waste storage, reuse/recycle and disposal updated monthly***	
Manufacture, Storage and Import of Hazardous Chemical Rules / Amendment Rules, 1989 with latest amendment	*Following shall apply to industrial activity in which a hazardous chemical satisfies any of the criteria listed in Part I of the Schedule I or listed in Part II of Schedule I:* • Occupier to **identify major accident hazards** and take adequate steps for prevention and control and provide to the persons working on the site information, training, equipment including antidotes.	
	• Occupier to arrange or develop information on **safety data sheets** (Schedule 9)	
	• **Label every container** of hazardous chemicals of its content name and address of the manufacture / importer and physical, chemical and toxicological.	
	• Occupier to **follow specified procedure for import** of hazardous chemicals, in case involved in the import.	

Act / Rules	*Procedural Requirements*	*Department Responsible*
	• **Notify major accident** within 48 hours to the concerned authority (Schedule 5) in the prescribed form (Schedule 6).	
	• **Submit notification of site to the concerned authority** (Schedule 5) and obtain the approval at least three months before commencing that activity	
	• **Update notification of site** in case of increase or decrease in the maximum threshold quantity of a hazardous chemical, to which rule applies.	
	• Occupier to **prepare and keep up-to-date on-site emergency plan** (Form 11). (Concerned authority to prepare and keep up-to-date an adequate on-site emergency plan. Occupier to provide the information for this purpose.)	
	• Occupier to **conduct mock drill** of the on-site emergency plan every six months and submit the report to the concerned authority	
	• Occupier to provide information to the outside persons or through district emergency authority about the nature of major accident hazards and do's and don'ts	
	• Occupier to **submit safety report** (Schedule 8) to the concerned authority at least 90 days before commencing that activity.	
	• Occupier to **submit safety audit report** to the concerned authority carried out with the help of an expert not associated with such industrial activities.	
The Public Liability Insurance Act / Rules, 1991 WITH LATEST AMENDMENT	• Owner to provide relief as specified in the Schedule in case of death or injury to any person (other than workman) or damage to property from the accident occurred while handling hazardous chemicals on the principle of no fault.	
	• Owner to draw insurance policy (ies) more than paid-up capital of the undertaking but less than Rs. 50 crore. In case is involved with handling hazardous chemicals more than prescribed under PLI Rules, 1991.	

Act / Rules	*Procedural Requirements*	*Department Responsible*
	- Owner to pay additional amounts as prescribed to the insurer not exceeding the amount of premium to the Environment Relief Fund to be established under the Act.	
	- Owner to provide any information required by the Ministry of Environment & Forests or any agency authorised for ascertaining compliance.	
The Bio-Medical Waste (Management and Handling) Rules, 1998 as amended till 2003	- The treatment and disposal of bio-medical wastes shall be as per Schedule I. Schedule I include 10 different categories of bio-medical wastes along with different treatments and disposal methods.	
	- Occupier to set up requisite bio-medical waste treatment facility as per prescribed time schedule in Schedule VI.	
	- Occupier to provide **label** in containers of bio-medical wastes as per Schedule IV in case of transportation outside the premises.	
	- **Not to store** bio-medical wastes beyond a period of 48 h.	
	- Every occupier involved in handling of bio-medical wastes providing treatment / services to equal to or more than 1 000 patients per month shall make an application in Form 1 to the prescribed authority for **grant of authorisation.**	
	- Every occupier / operator of a facility to submit an **annual report** to the prescribed authority in Form 2 by 31st January every year to include information about the categories and quantities of bio-medical wastes handled during the previous year.	
	- Every occupier / operator of a facility to maintain **records** of handling of bio-medical waste.	
	- To **report accident** occurred while handling bio-medical wastes in the prescribed Form 3 to the prescribed authority.	

Act / Rules	*Procedural Requirements*	*Department Responsible*
Explosive Act, 1884 • Gas Cylinder Rules, 2004	• Procurement of gas cylinders having valid inspection and testing of cylinders and valves including construction as per specified standard with proper labelling and colour coding	
	• Storage of gas cylinders away from sources of heat (direct flame), direct sunlight and no hot work to be carried in vicinity	
	• Cylinders to be stored and transported with provision of fall protection and valves to be provided with cap for protection • Flash back arrestors to be provided during use of oxygen and DA/LPG gas cylinders	
	• Limitation on storage of gas cylinders (LPG 100 kg)	
The Petroleum Act, 1934 (as Amended till 1977) and The Petroleum Rules, 1976 (as Amended till 2002)	• Obtain license for import/storage of petroleum to India (excluding the exemptions as specified in Section 7, 8 & 9 of *The Petroleum Act*)	
	Petroleum Class B *If the total quantity in possession at any one place does not exceed 2 500 litres and none of it is contained in a receptacle exceeding 1 000 litres in capacity.* ***Petroleum Class C*** *If the total quantity in possession at any one place does not exceed 45 000 litres and such petroleum is transported or stored in accordance with the rules under Section 4.* ***Petroleum Class A*** *In case it is not intended for sale and the total quantity in his possession does not exceed 30 litres.* • Obtain **prior approval/ license of specification and plans of premises** for storage.	
The Factories Act, 1948 (as Amended till 1987) & State	• Obtain Factory License and Renew it	

Act / Rules	*Procedural Requirements*	*Department Responsible*
Factories Rules 19xx	• Lay down a detailed **Health and Safety Policy** at the time of registration for the factory involving hazardous process and intimate such policy to chief inspector and local authority and also inform the change made in the policy.	
	• Draw an **on-site emergency plan** and detailed disaster control measures and obtain approval of the chief inspector and make known to the workers and general public in the vicinity.	
	• Set up **safety committee** consisting of equal number of representatives of workers and management in a factory where a hazardous process takes place or where hazardous substances are used or handled.	
	• **Notify** prescribed authority about the **occurrence of an accident**, which causes death or any bodily injury by reason of which the person is prevented from working for a period of 48 h or more **and/or Dangerous Occurrence** The following **classes of dangerous occurrences**, whether or not they are attended by personal injury or disablement : 1. Bursting of a plant used for containing or supplying steam under pressure greater than atmospheric pressure. 2. Collapse or failure of a crane, derrick, which, hoist or other appliances used in raising or lowering persons or goods, or any part thereof, or the overturning of a crane. 3. Explosion, fire, bursting out, leakage or escape of any molten metal, or hot liquid or gas causing bodily injury to any person or damage to any room or place in which persons are employed. 4. Explosion of a receiver or container used for the storage at pressure greater than atmospheric pressure of any gas or gases (including air) or any liquid or slid resulting from the compression of gas. 5. Collapse or subsidence of any floor, gallery, roof, bridge, tunnel, chimney, wall, building or any other structure.	

Act / Rules	*Procedural Requirements*	*Department Responsible*
	• Occupational Disease as provided in the schedule to Factories Act/Rules	
	Approval of Building layout/plan • Structural Stability Inspection of plant building • Testing of lifting tools, tackles and machines • Testing of Pressure Vessel • Use of Work Permit for Work at Height (above 2 m from floor/platform), Confined Space Entry, Electrical Line, Hot Work in flammable/combustible storage area (HSD/ Coal/ lubricant oil) • Information to workers: MSDS of chemicals, SOP for use, handling, storage and disposal • Provision of eye wash fountain and showers near hazardous chemical storage and handling • Guarding on machinery • OHC with trained nurse / First Aiders • Medical check – Fitness Certificate of each personnel – Eye Examination of crane, MHV operator – Audiometry exposed to high noise – Spirometry exposed to dusty/ hazardous chemical work environment • Adequate Illumination at workplace and walk way • Ergonomics – manual load lifting and handling • PPE Provision and Use • Fire Extinguishers and Fire Bucket provision • Conduct quarterly Mock Drills Dangerous Operations - safety precautions	
The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 / 2000	The major accident hazard installation in the industrial pockets shall aid, assist and facilitate the functioning district/ local crisis group.	
The National Environment Tribunal Act, 1995	On death of any person (other than a workman) or damage to any property or environment on account of an accident, the owner shall be liable to pay for such death,	

Act / Rules	*Procedural Requirements*	*Department Responsible*
	injury or damage.	
The Batteries (Management & Handling) Rules, 2001 Amendment 2010.	Consumer to avail discount in lieu of used batteries and make agreement with supplier for buy back of used lead batteries. Six Monthly Return submission for Batteries	
The Ozone Depletion Substances (Regulation) Rules, 2000	Maintain records for ODS used	
E-Waste Rules, 2011	Consumers or bulk consumers of EEE listed in Schedule 1 of the Rules shall ensure that e-waste generated by them is channelized to authorized collection centres or registered dismantlers or recyclers or is returned to the take back services provided by the producers.	
Electricity Act and Electricity Rules 1956 and 2005	• Inspection of Electrical Equipments – Transformer • Earth Pit testing • Provision of earthing and double earthing to MCC • ELCB provision • First Aid Display chart • Danger sign boards on PCC and MCC and lighting DB • Transformer Oil testing • Electrical license • Authorised personnel displayed • Class A contractor deployed	
Central Motor Vehicle Act and Rules	• License of Driver • PUC Certificate • Hazardous Material transportation training • HAZCHEM Label • First Aid Box and Fire Extinguisher • TREM CARD	

NOTE — Organization to identify & define.

ANNEX B

(*Clause* 6.1.3)

TYPICAL ENVIRONMENTAL ASPECTS OF A SSP FERTILIZER PLANT

(BUT NOT LIMITED TO)

Sl No.	*Activity*	*Environmental Aspect*	*Environmental Impact*
A. SSP (Single Super Phosphate) Production			
1. Rock phosphate handling			
1.1	Unloading of rock phosphate	Rock phosphate spillage	Land pollution, resource depletion
1.2	Rock phosphate feeding to hopper	Rock phosphate spillage	Air pollution due to emission of dust
2. Grinding of rock phosphate			
2.1	Ball mill Operation	Rock phosphate dust over consumption of rock High Noise	Air pollution due to emission of dust Resource depletion Noise pollution
2.2	Operation of DC bags	High Noise	Noise pollution
		Bag damage in operation high stack emission	Air pollution
		Bag damage	Waste generation
2.3	Ground rock phosphate handling.	Rock phosphate spillage	Air pollution and Resource depletion
3. Handling and storage of sulphuric acid			
3.1	Transfer of sulphuric acid	Acid spillage on land	Land pollution, ground water pollution
		Over consumption of acid	Resource depletion
3.2	Spent acid tanker unloading	Acid spillage on land	Land pollution, ground water pollution
		Over consumption of acid	Resource depletion
3.3	Acid storage.	Sudden acid leakage.	Acid spillage on land causing land and water pollution
4. Operations in acidulation section			
4.1	Mixing of rock, acid and silica water.	Release of Fluoride gas at work environment and stack emission	Air pollution
4.2	Cleaning of Pre-mixer and Mixer	Release of Fluoride gas at work environment and effluent water generation	Air and water pollution
4.3	Cleaning of duct lines of Pre-mixer, Mixer and Den	Release of Fluoride gas at work environment and effluent water generation	Air and water pollution
4.4	Cleaning of scrubbing tower	Release of Fluoride gas at work environment and effluent water generation	Air and water pollution
4.5	Chimney cleaning	Consumption of raw water. Release of waste water	Water pollution Ground water depletion
5. Draining of silica water			
5.1	Spillage of acidic water and silica sludge	Acidic water spillage	Land pollution
5.2	Transfer of silica water to scrubber	Acidic water spillage	water pollution

Sl No.	*Activity*	*Environmental Aspect*	*Environmental Impact*
5.3	Shifting of dry silica	Acidic silica spillage.	Land nuisance
6.	**Transportation of green SSP through crane**	Emission of gasses at work place	Air pollution
B. GSSP (Granulated Single Super Phosphate) production			
1. SSP handling			
1.1	SSP feeding at RM hopper by crane	Spillage of SSP	Air pollution
1.2	Material handling in process by conveyor belts	Spillage of SSP	Air pollution
1.3	Material handling in process by bucket elevator	Spillage of SSP	Air pollution
1.4	Screening of material	Spillage of SSP	Air pollution
2. Granulation, Drying and Cooling of Product			
2.1	HAG operation	Generation of coal dust in handling	Air pollution
		High noise	Noise pollution
		Stack emission	Air pollution
2.2	Granulation, Drying and cooling of GSSP	Emission of SSP dust	Air pollution
		High noise	Noise pollution
3. Equipment cleaning			
3.1	Hopper descaling	Emission of SSP dust	Air pollution
3.2	Drum descaling	Emission of SSP dust	Air pollution
3.3	Cleaning of chain mill	Emission of SSP dust	Air pollution
3.4	Screens cleaning	Emission of SSP dust	Air pollution
3.5	Crushing of Over size material from chain mill	Emission of SSP dust	Air pollution
		High noise	Noise pollution
3.6	Cyclone cleaning	Emission of SSP dust	Air pollution
4. Material packing and stacking in 50 Kg bags			
4.1	Filling of 50 Kg Bags	Spillage of GSSP	Land pollution
4.2	Weighment and stitching of 50 Kg bags	Spillage of GSSP	Land pollution
4.3	Shifting of bags up to 60 m distance and stacking of bags up to 30 bags height.	Spillage of GSSP during shifting	Land pollution
5. Quality Control			
5.1	Handling & sampling of inflammable materials.	Leakage or spillage, Emission of vapors	Land pollution, ground water pollution Waste generation Fire
5.2	Handling & sampling of non-flammable materials	Leakage or spillage,	Land pollution, ground water pollution Waste generation
5.3	Tanker checking	Leakage or spillage,	Land pollution, ground water pollution Waste generation
5.4	Carrying of samples from store and plants to QC Lab	Leakage or spillage,	Land pollution, ground water pollution Waste generation
5.5	Washing of Glassware	Glassware Breakage/ waste generation Waste water generation	Waste generation Water pollution
5.6	Storage of retained samples	Spillage	Waste generation Land pollution
5.7	Disposal of retained samples.	Spillage, Waste generation	Waste generation

Sl No.	*Activity*	*Environmental Aspect*	*Environmental Impact*
			Land pollution
5.8	Storage of Analytical grade chemicals	Leakage, spillage,	Waste generation Land pollution
5.9	Disposal of chemical waste obtained during testing	Spillage	Waste generation Land pollution
6. Supply Chain			
6.1	Loading / Dispatch of PSSP/ Rock phosphate/ GSSP Tractor / dumper movement	Vehicle Movement/ bag drop / unloading cause fugitive dust emission	Air pollution
		Vehicle engine running causing exhaust fume	Air pollution
		oil consumption	Resource depletion
		During movement gear/ brake oil leakage	Water pollution, Land Pollution Resource Depletion
		Blow horn	Noise pollution
6.2	Working at Computer	Power consumption	Resource consumption
		electronic waste generation	Land pollution
7. **EHS**			
7.1	Plant safety inspection and modification	Waste generation, Energy consumption	Land pollution Resource depletion
7.2	Mock Drills	Fugitive emission Consumption of water Generation of contaminated water Generation of solid waste	Air pollution Water consumption Waste water generation Land contamination
7.3	ITM of fire extinguishers	Generation of solid waste, resource consumption Fugitive emission Water consumption Waste water generation	Air pollution Water pollution Land contamination
7.4	Conduct Training	Energy consumption Generation of solid waste Resource consumption	Land contamination Power consumption
7.5	O&M RO	Energy consumption Generation of treated waste water Generation of contaminated water Generation of solid waste	Resource depletion Land pollution Ground water pollution
7.6	O&M STP	Energy consumption odour Generation of treated waste water Generation of contaminated water Generation of solid waste,	Resource depletion Local nuisance Land pollution Ground water pollution
7.7	Recording of bore well and plant supply water meters reading and ground water level	Generation of solid waste, Resource consumption Ground water depletion/raw water availability	Land pollution Ground water depletion
7.8	Inspection and maintenance of PCE (scrubber, Haz waste	Stack emission Leakage from storage pit	Air Pollution Water pollution

Sl No.	*Activity*	*Environmental Aspect*	*Environmental Impact*
	storage pit, cyclones, bag filter, dust collector)	Leakage from PCE	Land pollution
7.9	Inspection and maintenance of storm water drains and RWH structures	Rain water wastage not recharged/reused Chemicals contaminants in Rain water?	Ground water depletion contamination
7.10	O&M of HF analyzer	Compressed air consumption Air emission Resource consumption Waste generation	Land contamination Power consumption Non-operation of SSP for high HF/ Business concern & crop damage/IPC
7.11	Prepare Documentation and maintain Records	Resource consumption Waste generation	Land contamination Resource depletion
7.12	Inspection of Sulphuric acid storage	Leakage/ Spillage of acid from tank	Land Contamination Water Pollution On-Site Emergency
7.13	Inspection and testing of lifting tools/tackles/machines & PV	Over consumption of resources/ waste generation Energy consumption Water consumption	Land contamination Resource depletion
7.14	Monitoring and testing for stack, ambient air and waste water	Over consumption of resources/ waste generation Energy consumption	Over consumption of resources/ waste generation
8. Human Resources			
8.1	Office work	Wastes (Paper work, Electronic and Plastic Waste & other waste) generated through routine work	Land pollution, resource depletion
8.2	Energy	Uses of Electricity	Over consumption of resources
8.3 8.4	Training & Development	Manpower Utilization-Skill, Infrastructure Facility	Over consumption of resources
8.5	Welfare- Canteen	Waste Generation & Water Consumption, Fuel Usages	Water, land and over consumption of resources
8.6	Welfare-Drinking Water	Waste	Water, land and over consumption of resources
8.7	Welfare-Toilet	Waste	Air, water, land and over consumption of resources
8.8	Visitor Management	Waste	Land pollution
8.9	Vehicle Management-Inside Plant	Exhaust emission	Air pollution
8.10	Housekeeping	Waste	Air, water and land pollution
8.11	Horticulture	Waste, Tree plantation, Horticulture development/ Green House	Air, water and land pollution, green cover area increase and seasonal flowering
9. Electrical Maintenance			
9.1	Maintenance of grid sub station	Waste equipment	Land pollution
9.2	Maintenance & Overhauling of Transformer	Leakage of Oil Disposal of cotton waste, waste equipment	Land contamination due to leakage of oil Land pollution
9.3	Operation of Transformer	Fire & Explosion of Transformer	Air pollution due to fire energy (resource)

Sl No.	*Activity*	*Environmental Aspect*	*Environmental Impact*
		Power consumption (transformer losses)	consumption
9.4	Maintenance of Motors	Generation of cotton waste Waste equipment	Disposal of cotton waste land pollution
9.5	Operation of power and motor control centers	Generation of gases during short-circuit	Air pollution
9.6	Maintenance of power and motor control panel	Disposal of waste clothes Disposal of overheated end pieces of cables & damaged spares	Land pollution
9.7	Maintenance of diesel generator	Power consumption Leakage of diesel Fumes exposure Noise pollution	Energy (resources) loss Land pollution Air pollution. Noise pollution
9.8	Lighting & air conditioning maintenance	Power consumption Waste equipment Release of gases	Energy(resources) loss Land pollution Air pollution
10 .Mechanical Maintenance			
10.1	Gas cutting and welding work	Exhaust gases emission in surrounding Waste generation	Air pollution Land pollution
10.2	Maintenance at height/ rigging work	Waste generation	Land Pollution
10.3	Maintenance of gear box	Leakage of gear box oil Waste generation	Land/ Water pollution
10.4	Maintenance of pumps	Leakage of hazardous liquid (SILICA WATER)from pump Waste generation	Water pollution land pollution
10.5	Maintenance of acid line	Leakage of hazardous acid (SULPHURIC ACID) from acid line Waste generation Fumes generation	Water pollution Land pollution Air pollution
10.6	Operation on lathe, grinding and drilling operation	Waste generation	Land pollution
10.7	V belt operation and maintenance	Waste generation	Land pollution
10.8	Lubrication and greasing work	Old grease /oil waste generation	Land pollution
10.9	Maintenance at HAG	Waste generation	Land pollution
10.10	Conveyor belt maintenance	Waste generation	Land pollution
10.11	Bucket elevator maintenance	Waste generation	Land pollution
10.12	Den maintenance work	Waste generation	Land pollution
11. Instrumentation			
11.1	Maintenance of SMF batteries for UPS	Disposal of waste clothes	Land pollution
		Damaged spares	Land pollution
		Disposal of waste clothes	Land pollution
		Damaged spares	Land pollution
		Disposal of USED battery	Land /Water pollution
11.2	Maintenance of electronic Instruments.	Disposal of PCBs or components.	Land pollution
11.3	Maintenance of sewing machine	Disposal of waste clothes	Land pollution
		Damaged spares	Land pollution

Sl No.	*Activity*	*Environmental Aspect*	*Environmental Impact*
11.4	HF analyzer	Disposal of waste clothes	Land pollution
		Damaged spares	Land pollution
12. Stores			
12.1	Unloading, storage and transfer of HSD	Spillage and leakage, Fire hazards	Air pollution, Water pollution, Land pollution, Resource depletion Emergency
12.2	Storage of lube oil/Paints	Leakage of drums, Emission from thinner drum	Air pollution, Water pollution, Land pollution, Resource depletion
12.3	Handling & storage of Used oil	Improper handling storage	Legal concern, Water pollution, Land pollution, Resource depletion
12.4	Collection, segregation, disposal and transportation of Non-hazardous waste	Solid waste, Land corrosion.	Water pollution, Land pollution
12.5	Unloading/Placement/Storage of steel	Land corrosion	Land pollution, Resource depletion
12.6	Collection, handling and disposal of used batteries	Improper handling, Acid spillage	Air pollution, Water pollution, Land pollution, Resource depletion
12.7	Oxygen/DA cylinder loading / unloading	Valve damage due to sudden fall of cylinders,	Air pollution , Resource depletion, Environmental hazards

ANNEX C

SUMMARY OF REQUIREMENTS OF IS/ISO 14001:2015

There are 18 requirements of the IS/ISO 14001:2015 standard:

a) Initial Environmental Review

b) **Environmental Policy** — develop a statement of the organization’s commitment to the environment

c) **Environmental Aspects and Impacts** — identify environmental attributes of products, activities and services and their effects on the environment

d) **Legal and Other Requirements** — identify and ensure access to relevant laws and regulations

e) **Objectives and Targets and Environmental Management Programme** — set environmental goals for the organization and plan actions to achieve objectives and targets

f) **Structure and Responsibility** — establish roles and responsibilities within the organization

g) **Training, Awareness and Competence** — ensure that employees are aware and capable of their environmental responsibilities

h) **Communication** — develop processes for internal and external communication on environmental management issues

j) **EMS Documentation** — maintain information about the EMS and related documents

k) **Document Control** — ensure effective management of procedures and other documents

m) **Operational Control** — identify, plan and manage the organization’s operations and activities in line with the policy, objectives and targets, and significant aspects

n) **Emergency Preparedness and Response** — develop procedures for preventing and responding to potential emergencies

p) **Monitoring and Measuring** — monitor key activities and track performance including periodic compliance evaluation

q) **Evaluation of Compliance** — develop procedure to periodically evaluate compliance with legal and other requirements

r) **Nonconformance and Corrective and Preventive Action** — identify and correct problems and prevent recurrences

s) **Records** — keep adequate records of EMS performance

t) **EMS Audit** — periodically verify that the EMS is effective and achieving objectives and targets

u) **Management Review** — review the EMS

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This Indian Standard has been developed from Doc No.: CHD 34 (2181).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi